REMARKS

This reply is in response to the Office Action dated November 11, 2007. Claims 1, 4, 5, 8-11, 14-15, 18-28, 30-55 are pending in the application. Claims 2, 3, 6, 7, 11-23, and 25-29 are cancelled. Claims 1, 4, 8-14, 18-28, and 30 stand rejected. New claims 56-71 are added. Support is found in claims 1 - 15 as originally filed. No new matter has been added. Entry of the foregoing amendment and reconsideration of the claims is respectfully requested.

Claim Objections

Claims 5, 15, 35, 44 and 52 are objected to because the Examiner suggests that the language "m and n are 1" is unclear. Applicant respectfully disagrees, however amendments have been made to claims 5, 35, 44 and 52 to clarify that m is 1 and n is 1. Claim 15 is cancelled.

The Examiner suggests that the embodiment where m is 1 and n is 1 is patentable over the art of record. Applicant has amended claims 32, 40, and 48 to require that m is 1 or 2 and n is 1 or 2. New claim 56 (a duplicate of previous claim 1) also requires m to be 1or 2 and n to be 1 or 2. Applicant respectfully suggests the claims are allowable and requests they be passed to allowance.

Claim 28 stands objected to for being dependent on a rejected base claim but would be allowable if rewritten in independent form. Applicant has added the limitations of claim 28, 23 and 21 to claim 1 and cancelled claim 28. Claim 1 contains all the limitations of claim 28 and the intervening claims 23 and 21. Applicant respectfully requests the objection be withdrawn.

Claim Rejections

Claims 1, 4, 5, 8-11, 14, 15, 18-27, 31, 32-35 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,336,746 (Tsutsui). The Examiner suggests that the process and catalyst taught in Tsutsui are essentially the same as that recited in the instant claims. The Examiner then indicates that he believes that the corresponding product produced by the process of the prior art exhibits essentially the same properties. Applicant respectfully disagrees. With regard to claims 1 to 63 each of those claims (if not cancelled) require m to be 1 or 2 (or just 1) and n to be 1 or 2 (or just 1). The Examiner has indicated that claims requiring m to be 1 and n to be 1 are patentable over the art of record. Thus the rejection is now applicable only to new claims 64 to 71. New claim 64 is similar to old claim 1, except,

among other things, that it is limited to a copolymer of propylene and ethylene (e.g. no termonomer).

Applicant respectfully traverses the rejection with respect to claim 64 on grounds that Tsutsui does not teach, show or suggest the claimed invention requiring Applicant's unusual distribution of ethylene in a propylene-ethylene copolymer. At a minimum, Tsutsui does not teach, show or suggest a propylene -ethylene copolymer comprising 5-72 wt% propylene; 5-28 wt% ethylene; a ratio of g' greater than or equal to 1.10 (as determined by the claimed formula); and a weight average molecular weight of 20,000 to 1,000,000 g/mol, as required in claim 64, et seq.

In the present invention, the effect of the comonomer addition is significant and surprising. The present invention relates to a method for preparing unique propylene polymers using a single species of metallocene catalyst that, in a single reactor, can surprisingly produce propylene copolymers having a broad composition distribution, specifically increasing comonomer content with increasing molecular weight." Specification at page 2, ll. 26-30. "It is well established that molecular weight, crystallinity, and melting point decrease substantially as comonomer content increases." Specification at page 2, ll. 12-14. In other words, it is expected to see a narrow Mw/Mn product with a narrow composition distribution. However, the present invention provides copolymers having a high weight average molecular weight (20,000 to 1,000,000 g/mol), narrow Mw/Mn and broad composition distribution ($g' \geq 1.10$) as illustrated in Figures 1 and 2. Referring to Figures 1 and 2, less comonomer (i.e. ethylene) addition was observed in the low Mw end and more comonomer (i.e. ethylene) addition was observed in the high Mw end. See, Figure 1 and page 35, line 4 through page 36, line 2. This observation was surprising. In fact, the opposite was expected because, it is expected to see a narrow Mw/Mn product with a narrow composition distribution (i.e. g' around 1.0), not a broad composition distribution. See Figures 1 and 2 where the comparative examples showed about the same comonomer addition at the low Mw end as at the high Mw end. The difference in g' from 1.0 to 1.1 is significant in both kind and degree. Accordingly, it is not obvious, inherent or otherwise expected, nor is there a reasonable basis to believe that the corresponding product produced by the process of Tsutsui exhibits essentially the same properties. Therefore, the claimed invention is both novel and not obvious in view of Tsutsui. Withdrawal of the rejection and allowance of the claims is respectfully requested.

Admittedly, Tsutsui discloses a list of various monomers and states that a mixture of two or more can be used. However, Tsutsui makes no specific reference or indicates any

desirability toward propylene-ethylene copolymers having 5 wt% to about 28 wt% of the ethylene and a weight average molecular weight of 20,000 to 1,000,000 g/mol. In Example 11, Tsutsui discloses a propylene-ethylene copolymer produced from a ethylenebis-(indenyl) zirconium dichloride. When we look at example 11 a bit more closely we can glean a few important pieces of information. First the reaction had a minimal amount of ethylene present such that only 1.3 mole % was incorporated. This means that it was physically difficult for the propylene-ethylene copolymer made in example 11 to have the unique comonomer distribution that Applicant's claims require (g' ratio). Specifically there was not enough ethylene present to get an uneven distribution of more comonomer in the higher molecular weight chains. Theoretically, to do so would have required that most or all of the comonomer be inserted in the longer chains and the reactivity ratios of the two monomers (ethylene and propylene) are too close to one another for this to happen at this low an ethylene concentration in the polymerization reactor. Second, when we compare Example 11 with Example 10 (which produced propylene homopolymer) we note that there is a melting point depression from 132°C to 125°C, a 7°C difference. It is known that there is generally a 5.5 °C depression in melting point per mole of comonomer for metallocene propylene polymers having an even distribution of comonomer among the chains. Example 11 reports the ethylene to be present at 1.3 mole%. 1.3 mol x 5.5 °C/mol = 7.15 °C. This correlates directly with the 7°C depression expected. This is evidence that the polymer produced in example 11 does not have Applicant's uneven distribution of comonomer (which is reflected in the g' ratio $\geq$ 1.10 required in the claims). Thus, we can say with a level of certainty that the copolymer produced in Example 11, which is the closest to the claimed invention, does not inherently have the required product properties of Applicant's claimed invention. It is likely that the lack of substitution on the indenyl ring in Examples 10 and 11 is at least partly responsible for this difference. Note that Applicant's claim 64 requires that position 4 or 7 be substituted on the indenyl ring.

Applicant notes that Tsutsui discloses the use of substituted metallocenes, however Tsutsui does not disclose or suggest the use of substituted metallocenes to make Applicant's special copolymers. Because it is believed and shown above that a specific combination of ethylene content (5-28 wt%) and carbon-bridged substituted hafnocene are required to produce a propylene copolymer having a narrow MWD *and* broad composition distribution (g' $\geq$ 1.10) and Applicant has shown example 11 does not have the required g' ratio, there is no reasonable basis to conclude that Tsutsui teaches, shows or suggests the claimed

invention. Therefore, withdrawal of the rejection and allowance of the claims is respectfully requested.

Furthermore, the laundry lists of monomers and catalysts disclosed in Tsutsui, simply provides an "obvious to try" situation. An invention is merely "obvious to try" if the prior art gives either no indication of which parameters are critical or no direction as to which of many possible choices is likely to be successful. Merck & Co. Inc. v. Biocraft Laboratories Inc., 10 USPQ2d 1843 (Fed. Cir. 1989). As stated above, Tsutsui makes no indication or direction as to the comonomer content in combination with the weight average molecular weight of a propylene copolymer. Therefore, Tsutsui failed to recognize the critical parameters and cannot be used to provide a "reasonable basis" to arrive at the claimed invention. Withdrawal of the rejection and allowance of the claims is respectfully requested.

Finally, with regard to Tsutsui it is important to note that one of the heralded benefits of metallocenes has been their unique capacity to produce polymers having narrow composition distribution (i.e. even distribution of the comonomers across the various polymer chains.) In the Ziegler-Natta copolymers that came before the metallocene copolymers, the comonomers were unevenly loaded in the lower molecular weight chains. When metallocenes proved so different from the prevailing Ziegler-Natta standard, the industry was excited by the possibilities presented. Applicant's claimed invention differs from both of these ancestors. Applicant's process produces polymers that have the comonomer unevenly loaded into the higher molecular weight chains. When this application was filed, this was considered astonishing. Up until that point, it was not thought that certain metallocenes could unevenly distribute comonomer among the polymer chains, specifically to the higher molecular weight chains. This unique feature is reflected in the g' ratio, which as page 13, line 12, *et seq.* describes, is related to the intrinsic viscosity of the fractions in question. Intrinsic viscosity is, *inter alia*, related to comonomer content. Thus both the old Ziegler Natta copolymers and the prior metallocene copolymers cannot have Applicant's unique g' ratio because they do not have the comonomer loaded into the higher molecular weight chains.

In light of the above Applicant respectfully request that the rejections under 35 U.S.C. § 103(a) over Tsutsui be withdrawn.

Claim Rejections

Claims 1, 4, 5, 8-11, 14, 15, 18-27, 31, 32-35 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,830,968 (Sadatoshi). The Examiner suggests that the propylene/C4 to C10 alpha olefin copolymers (which optionally can contain ethylene, if the ethylene doesn't affect the product properties) have substantially the same properties as Applicant's polymers. Applicant respectfully disagrees. With regard to claims 1 to 63 each of those claims (if not cancelled) require m to be 1 or 2 (or just 1) and n to be 1 or 2(or just 1). The Examiner has indicated that claims requiring m to be 1 and n to be 1 are patentable over the art of record. Thus the rejection is now applicable only to new claims 64 to 71. New claim 64 is similar to old claim 1, except, among other things, that it is limited to a copolymer of propylene and ethylene (e.g. no termonomer).

Applicant's claim 64 is limited to propylene ethylene copolymers having at 5% to 28 wt% ethylene. This amount of ethylene would surely "affect" the propylene copolymer properties. Commercial random copolymers of propylene (RCP's) have 0.5 to about 5 wt % ethylene and they have very different properties versus commercial homopolypropylene. Thus it is reasonable to say that Sadatoshi does not disclose, suggest or make obvious Applicant's specific copolymers. Applicant respectfully requests the rejection be withdrawn.

Having addressed all issues set out in the office action, Applicant respectfully submits that the pending claims are now in condition for allowance. Applicant invites the Examiner to telephone the undersigned attorney if there are any issues outstanding which have not been addressed to the Examiner's satisfaction. The Commissioner is hereby authorized to charge counsel's Deposit Account No. 05-1712, for any fees, including extension of time fees and excess claim fees, required to make this response timely and acceptable to the Office.

Respectfully submitted,

January 9, 2008
Date

/Catherine L. Bell/
Catherine L. Bell
Attorney for Applicants
Registration No. 35,444

ExxonMobil Chemical Co.
Law Technology
P.O. Box 2149
Baytown, Texas 77522-2149
Phone: 281-834-5982
Fax: 281-834-2495